

cancelled and no claims have been amended. Accordingly, 4-6, 9-11, 14-16 and 19-22 are pending.

**I. Claims Rejected Under 35 U.S.C. §103(a)**

Claims 4, 5, 9, 10, 14 and 15 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,665,643 issued to Shin (hereinafter "Shin") in view U.S. Patent No. 5,747,361 issued to Ouellet (hereinafter "Ouellet") and U.S. Patent No. 5,234,221 issued to Ryan et al (hereinafter "Ryan"). Applicants respectfully disagree for the following reasons.

In order to establish a *prima facie* case of obviousness, the Examiner must show that the cited references, combined, teach or suggest each element of the claims, and further that there must be a reason or suggestion from the prior art to combine the references. In regard to claim 4, Applicants believe the Examiner has failed to establish a *prima facie* case of obviousness because the cited references are improperly combined to teach the elements of claim 1. The Examiner admits in Paper No. 17 that Shin does not teach an interconnect including an aluminum copper titanium (Al-Cu-Ti) alloy containing 0.1 atomic percent titanium or about 0.5 atomic percent copper. The Examiner relies on Ryan to suggest that about .5 atomic percent of copper be used in an Al-Cu-Ti alloy. However, Ryan teaches either doping an aluminum alloy with titanium *or* copper, it does not teach an Al-Cu-Ti alloy. Applicants believe the language of Ryan uses the term 'or' as an 'exclusive or' and thus does not teach doping with both titanium and copper. The Examiner justifies the combination of Ryan with Shin by stating that it would have been obvious to combine the references "in order to avoid electromigration problem." However, Ryan expressly teaches away from this basis for combination because the doping of an aluminum alloy by copper or titanium discussed by Ryan at col. 1, lines 57-61 is stated be "unsatisfactory because high concentrations of copper make dry-etch pattern definition more difficult, and lines

more susceptible to corrosion.” Ryan col. 1, lines 62-65. Further, this doping of an aluminum alloy identified by the Examiner does not solve “creep and elctromigration.” See Ryan col. 1, lines 65-68. Instead, Ryan goes on to teach the use of an iron dopant in an aluminum alloy as a solution. See Ryan col. 2, lines 1-10. Thus, Ryan cannot be combined with Shin to teach each of the elements of claim 4.

Oullet does not cure the defects of Ryan and Shin. The Examiner has not identified any part of Oullet that teaches or suggests the use of about .5 atomic percent copper in an Al-Cu-Ti alloy. Further, the Examiner relies on Oullet to teach an Al-Cu-Ti alloy that includes less than .57 atomic percent titanium. The Examiner cites col. 19, lines 25-50 as teaching an aluminum alloy layer containing 1.25 weight percent titanium to .05 weight percent titanium. However, the cited section of Oullet discusses an Al-Ti alloy not an Al-Cu-Ti alloy. Thus, Oullet does not teach an Al-Cu-Ti alloy that contains less than .57 atomic percent Titanium. It is nonsensical to combine the Al-Cu-Ti alloy of Shin with the Al-Ti alloy of Oullet because these are distinct alloys each with a distinct set of properties. Therefore, Shin in view of Ryan and Oullet do not teach each of the elements of claim 1. Rather, the Examiner uses hindsight to piece together the cited references in order to state that the claimed subject matter is rendered obvious. This hindsight reconstruction is not a permissible basis of forming an obviousness rejection. See *In re Fitch*, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992). Accordingly , reconsideration and withdrawal of the obviousness rejection of claim 4 are requested.

In regard to claim 5, this claim depends from independent claim 4 and incorporates the limitations thereof. Thus at least for the reasons mentioned in regard to claim 4 this claim is not obvious over the cited references. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 5 are requested.

In regard to independent claims 9 and 14 these claims include many of the same elements as independent claim 4, namely an Al-Cu-Ti alloy that is less than .57 atomic percent titanium and about .5 atomic percent copper. Thus, these claims are not obvious over the cited references for the reasons mentioned in regard to claim 4. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 9 and 14 are requested.

In regard to claims 10 and 15, these claims depend from independent claims 9 and 14 respectively. Thus, for the reasons mentioned in regard to claims 9 and 14 these claims are not obvious over the cited references. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 9 and 14 are requested.

The remaining references Shin and Ouellet do not teach or suggest an interconnection comprising an aluminum copper titanium alloy layer that contains 0.5 atomic percent of copper. Thus, each of the elements of independent claims form 9, 14 and 16 are not taught by Shin in view of Ouellet. Therefore, these claims are not obvious over the cited references. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 4, 9 and 14 are requested.

In regard to claims 5, 10 and 15, these claims depend from independent claims 4, 9 and 14, respectively, and incorporates the limitations thereof. Therefore, at least for the reasons mentioned in regard to claims 4, 9 and 14, these claims are not obvious over Shin in view of Ouellet. Accordingly, reconsideration and withdrawal of the obviousness rejections of claims 5, 10 and 15 are requested.

Claims 6, 11, 16 and 19-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shin in view of Ryan and Ouellet and further in view of U.S. Patent No. 5,635,763 issued to Inoue, et al. (hereinafter "Inoue"). Applicants disagree for the following reasons.

Claims 6 and 11 depend from independent claims 4 and 9, respectively. Thus, for the reasons mentioned above in regard to claims 4 and 9, these claims are not obvious over Shin in view of Ryan and Oullet. Further, Inoue does not teach an aluminum copper titanium alloy having 0.5 atomic percent copper or less than .57 atomic percent titanium and thus does not cure the defects of Shin, Ryan and Oullet. Thus, the cited references cannot be combined to teach or suggest each of the elements of claims 6 and 11. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 6 and 11 are requested.

In regard to independent claim 16, this claim includes, many of the same elements of claims 6 and 11, specifically, first and second layers of titanium and titanium nitride above and below an Al-Cu-Ti alloy that contains less than .57 atomic percent titanium and about .5 atomic percent copper. Thus, for the reasons mentioned in regard to claim 6 and 11, this claim is not obvious over the cited references.

In regard to claims 19-21, these claims depend from independent claim 16 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 16, these claims are not obvious over Shin in view of Ryan, Oullet and Inoue. Accordingly, reconsideration and withdrawal of the obviousness rejections of claims 19-21 are requested.

## **II. New Claim**

New claim 22 has been added. This claim depends from independent claim 4 and incorporates the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 4, this claim is not obvious over Shin, Ryan, Oullet and Inoue. Further, this claim includes the elements of the Al-Cu-Ti alloy having a range of resistance from 2.8 to 3.1 micro Ohm-cm. Applicants believe the cited references do not teach an interconnect including an Al-Cu-Ti alloy having this property. Accordingly, reconsideration and withdrawal of the obviousness rejection are required.

### CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely claims 4-6, 9-11, 14-16 and 19-22 patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207 3800.

Respectfully submitted,

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